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DIRECTORATE OF
INTELLIGENCE

Basic Imagery Interpretation Report

Lien-hua Cheng Dam and Hydro
Power Plant (Liu-chia Gorge)
Yung-ching, China

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
Imagery Analysis Service

INSTALLATION OR ACTIVITY NAME		COUNTRY
Lien-hua Cheng Dam and Hydro Power Plant (Liu-chia Gorge)		CH
UTM COORDINATES	GEOGRAPHIC COORDINATES	[redacted] 25X1 WAC-PIC
48SUQ503777	35-56-00N 103-20-30E*	0384-37
MAP REFERENCE		
15th RTS. USATC Series 200, Sheet 0384-IHL, 1st edition, Mar 64, Scale 1:200,000 (SECRET)		
[redacted] 25X1	NEGATION DATE (If required)	
	Not Required	

ABSTRACT

The Lien-hua Cheng Dam and Hydro Power Plant (Liu-chia Gorge) was under construction when first seen on photography in September 1959. Since then work has progressed slowly, in part due to flooding by the Yellow River. In December 1968, the main dam and auxiliary dam were nearing completion and a reservoir, about 15 nautical miles long, had been formed. When the powerhouse was last seen on large-scale photography in April 1968, it was still under construction. When the power plant is completed, it will generate electric power for the Lan-chou power grid.

*NOTE: The geographic coordinates given in the Data Block are from the Basic Encyclopedia. The correct coordinates are 35-52-16N 103-16-19E, UTM coordinates 48SUQ442709. Action has been initiated through appropriate channels to have the BE corrected.

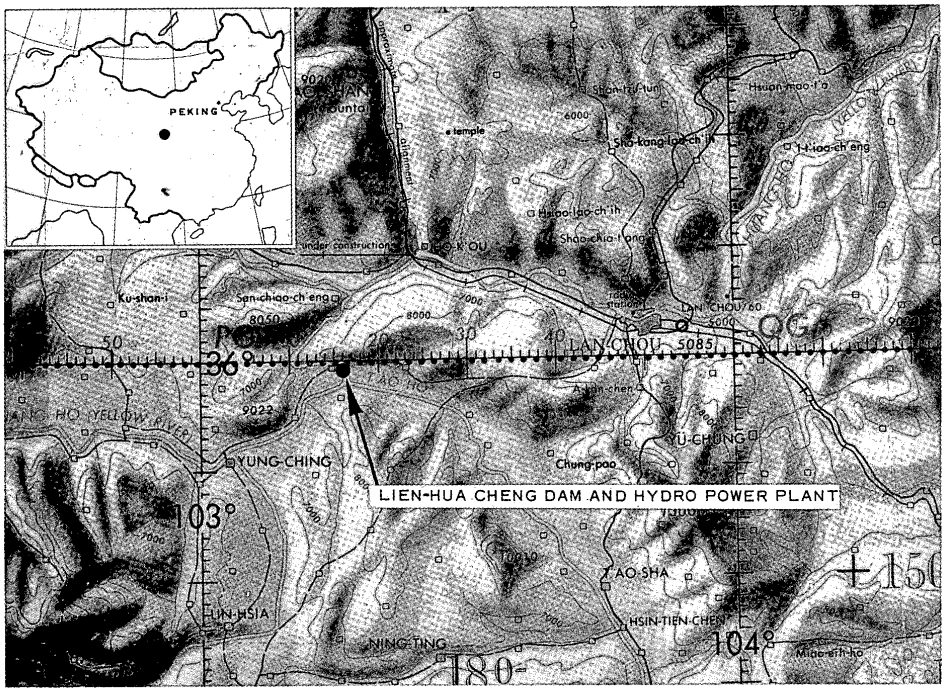

FIGURE 1. LOCATION MAP

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INTRODUCTION

The Lien-hua Cheng Dam and Hydro Power Plant, called the Yung-ching Hydro Power Plant in the referenced report, is located on the Huang Ho (Yellow River) approximately 25 nautical miles (nm) west of Lan-chou. The plant site is in the Liu-chia Gorge and the river channel is 150-200 feet wide at that point. The river flow varies widely, with the peak period occurring between July and September and the drought period from November to May.

BASIC DESCRIPTION

Construction of the Lien-hua Cheng Dam and Hydro Power plant was in the early stages when the site was first seen on photography in September 1959. By December 1968, the main dam and auxiliary dam were in the late stages of construction and a large reservoir had been created. The construction status of the powerhouse at the foot of the dam could not be determined due to the small scale of the December 1968 coverage. On large-scale photography of April 1968, the powerhouse was not complete and none of the turbogenerators had been installed.

When completed, the facilities will include a primary gravity-type concrete dam in the river gorge and an auxiliary concrete and earth-fill dam on a terrace to the north of the primary dam. The powerhouse will contain five turbogenerators, three at the base of the dam in the gorge and two in an extension under the right bank of the river. Two spillways, one incorporated into the primary dam and the other in the auxiliary dam, will be used to regulate the reservoir level. At least two transmission circuits presently serve the transformer substations utilized for construction purposes. These transmission lines may be used along with others yet to be constructed to transmit electrical power to the Lan-chou power grid when the power plant is completed.

Chronology

September 1959. Initial construction of the auxiliary dam was evident and activity was apparent at the construction support area.

February 1962. The site was still in an early stage of development. A single bypass tunnel under the left bank and an earthen cofferdam had been constructed to control the river flow and divert it from the dam site. The appearance of the cofferdam and the main dam site indicated that possibly some washover had occurred. Additional measures to provide protection from flooding did not appear to be under construction. The construction support area consisted of bases for several batch plant components, some small sheds, and excavations for the materials storage area. The tracks for movable supports for an aerial cableway across the gorge were under construction on the left bank. Continued earth-moving was evident at the auxiliary dam base.

February 1962-December 1965. Construction was delayed during this period as a result of September 1963 and August 1964 flooding which innundated the dam site. Some work which appeared to be completed in the gorge prior to the flooding may have been damaged. The main emphasis during this period was apparently on the development of additional river diversion measures. A housing and support base was observed north of the dam site in June 1963. The screening and mixing equipment of the batch plant was completed and equipped with a conveyor by August 1964. A pedestrian bridge spanning the gorge and additional construction at the auxiliary dam were apparent in November 1964. Between November 1964 and December 1965, there were few apparent changes to the main dam.

[redacted] Additional protective measures to prevent flooding were observed. An arch-type cofferdam and an additional diversion tunnel under the right bank were completed. A large A-frame support at the right bank, associated with the aerial cableway, and the supports for the aerial cableway at the left bank were observed. Construction of a roadbed for a rail spur to serve the construction support area was in progress, and an associated bridge spanning the spillway runoff canal was being built. A conveyor for transporting raw materials from the northwest had been constructed, and two spray ponds appeared complete.

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25X1 The additional diversion tunnel and the arch-type cofferdam were evidently considered sufficient for river control as construction had resumed at the base of the gorge. Numerous vehicles, equipment, and cranes were observed throughout the area. A rail spur had been extended along the river toward the base of the dam to a point near the right diversion tunnel outlet.

25X1 The dam structure could be observed within the gorge. The auxiliary dam and associated spillway were still under construction and the rail spur to the construction support area had been completed.

25X1 The dam was of sufficient height to hold back some of the river flow and a reservoir had been created. The reservoir level covered the arch-type cofferdam.

25X1 The core of the dam had been completed (Figure 2), and the reservoir level had receded. The arch-type cofferdam (Item 1, Figure 2) had been damaged and some sections were displaced. The penstock control gate housings and activity at the auxiliary dam, powerhouse area, and the spillway channel were observed. The spillway flume (Item 12) had been completed. The covers of two of the three turbines to be located at the base of the dam were observed in place (Item 11). A portion of the structure under the right bank which will contain two turbines was visible (Item 10). Also observed were two sets of penstock control gate housings (Item 5) at the top of the dam and two discharge outlets within the gorge (Item 13) which will serve the underground turbogenerators. A road and a possible rail section had been constructed to the powerhouse area and will probably be used to handle the generating equipment.

25X1 The main dam was nearly complete. A reservoir extending for at least 15 nm to the west had been created and the spillway flume was in use. The section of the auxiliary dam between the spillway and main dam was nearing completion, except for that area at the aerial cableway track which had not advanced beyond the footing stage. North of the spillway, the earth-fill extension of the auxiliary dam was nearing completion. Within the spillway run-off channel, the protective concrete sides had been extended to the west and will probably be completed to the gorge. No switching yard was observed.

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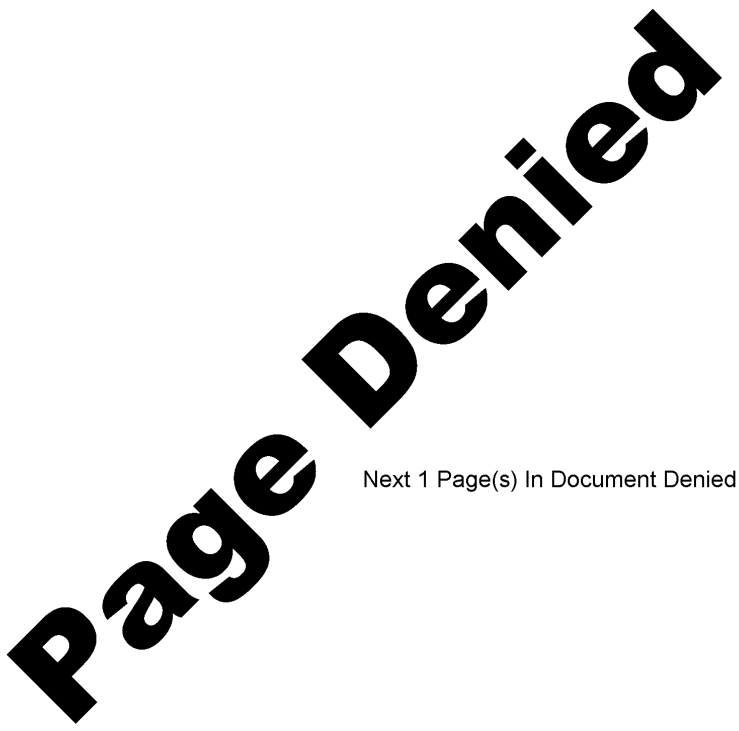

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REFERENCES

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Maps

15th RTS. US Air Target Chart Series 200, Sheet 0384-IHL, 1st edition, March 1964, Scale 1:200,000 (SECRET)

ACIC. USAF Operational Navigation Chart, Sheet G-9, 2nd edition, January 1963, Scale 1:1,000,000 (UNCLASSIFIED)

Documents

CIA. PIR 75010, Chinese Power Plants, Kansu Province, July 1966, (TOP SECRET RUFF) 25X1

Requirement

EXSUBCOM - BR-N/002-69

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